BNL - 420

Department of Energy
Brookhaven Area Office
P.O. Box 5000
Upton, New York 11973

NOV 08 2001

Ms Loretta Cunniff
Brookhaven Science Associates, LLC
Brookhaven National Laboratory
Upton, New York 11973

Dear Ms Cunniff:

SUBJECT: NEPA DETERMINATIONS

We have reviewed the Environmental Evaluation Notification Form for the following activity:

- Prototype Electron Cooling Device

and have determined it to be a Categorical Exclusion. A copy of the determination is enclosed.

If you should have any questions regarding this matter, please contact Caroline Polanish of my staff at extension 5224.

Sincerely,

M. Holland

Michael D. Holland
Area Manager

Enclosure:
As stated

cc: J. R. Oprzedek, TS, CH, w/encl.
C. Polanish, BAO, w/encl.
M. Davis, BNL, w/encl.

National Environmental Policy Act (NEPA)
ENVIRONMENTAL EVALUATION NOTIFICATION FORM

Grantee/Contractor Laboratory: BROOKHAVEN NATIONAL LABORATORY

Project/Activity Title: Prototype Electron Cooling Device

CH NEPA Tracking No.: BNL-420 Type of Funding: Nuclear Physics

B&R Code: _____ Total Estimated Cost: $10 M

DOE Cognizant Secretarial Officer (CSO): James Decker, Acting SC-1

Contractor Project Manager: I. Ben-Zvi Signature: Ilan Ben-Zvi

Date: 10-18-2001

Contractor NEPA Reviewer: M. Davis Signature: Mark C. Davis

Date: 10/22/01

I. Description of Proposed Action:

The proposed action would install a prototype electron accelerator system in the experimental hall of Building 939. The proposed electron accelerator would consist of photocathode RF electron guns ("Photoinjectors"), a laser system to drive the photocathode, a superconducting linac section, electron beam transport consisting of an evacuated tube and various magnets and a beam-dump. Two photoinjectors would be planned. A superconducting photoinjector would generate an electron beam of about 1 mA current at an energy of about 2 MeV. A copper photoinjector would generate an electron beam of about 100 mA up to 4 MeV energy. The superconducting linac energy would reach up to 50 MeV. Energy recovery of the linac would be used, so that the electrons would be dumped at the photoinjector energy.

The copper photoinjector would require a large amount of RF power, about 1 MW, and a water-cooling system, including cooling tower, associated with this system. Cooling-tower water would be treated either with ozone or with biocides and rust inhibitors. Effluent from the cooling tower would be routed either to the existing storm drain system, or to the recently (2001) excavated recharge basin north of buildings 902 and 905.

The machine cooling system would be a closed loop deionized water system using ion exchange beds that would be removed for regeneration or disposal by a contractor off site. In no case would the electron beam strike the water directly, so water activation could only occur due to bremsstrahlung produced when electrons strike the accelerating structure or the beam pipe. At the proposed beam current and energy, no induced activity in water would be expected. Discharge of contaminants to the ground or to the sanitary system would be neither planned nor expected from the accelerator cooling system. The closed loop cooling system would be connected to the cooling tower via a heat exchanger.

The photocathode laser would be a class 4 laser, running mode-locked CW operation in a wavelength of about 1 micron with harmonic generation to 0.5 micron.

The proposed facility would be located in the (30 x 80 ft) experimental hall of the existing building (Building 939). Additional areas within Building 939 would be

used for support systems such as electronic racks, controls, water treatment systems, etc. There are no new building construction actions other than the cooling tower. Services such as water, power, telephone, fire alarm, etc., come from existing utility systems. The existing radiation shielding around Building 939 (concrete and sand) would continue to be utilized for the proposed action. The tunnels leading into the Building 939 experimental hall area would not be utilized by this project. Access controls, such as gates, etc. would be used to prevent unauthorized access.

Acceleration of electrons at the proposed energy levels would result in low levels of activation at beam stops and equipment. At these electron energy levels, the generation of tritium would be expected to be at level below monitoring and regulatory measures. A sampling program would be established to confirm anticipated levels.

II. Description of Affected Environment:

The affected area would include the existing Building 939 and the immediate surrounding areas necessary for cooling tower placement and piping routes. No impacts to environmentally sensitive areas would be anticipated.

III. Potential Environmental Effects: (Attach explanation for each "yes" response and "no" response if additional information is available and could be significant in the decision making process.)

A. Sensitive Resources: Will the proposed action result in changes and/or disturbances to any of the following resources?	**Yes/No**
1. Threatened/Endangered Species and/or Critical Habitats	No
2. Other Protected Species (e.g., Burros, Migratory Birds)	No
3. Wetlands	No
4. Archaeological/Historic Resources	No
5. Prime, Unique or Important Farmland	No
6. Non-Attainment Areas	No
7. Class I Air Quality Control Region	No
8. Special Sources of Groundwater (e.g., Sole Source Aquifer)	Yes
9. Navigable Air Space	No
10. Coastal Zones (e.g., National Forests, Parks, Trails)	No
11. Areas w/Special National Designation (e.g., National Forests, Parks, Trails)	No
12. Floodplain	No

B. Regulated Substances/Activities: Will the proposed action involve any of the following regulated substances or activities?	**Yes/No**
13. Clearing or Excavation (indicate if greater than 5 acres)	Yes
14. Dredge or Fill (under Clean Water Act section 404; indicate if greater than 10 acres)	No
15. Noise (in excess of regulations)	No
16. Asbestos Removal	No
17. PCBs	No
18. Import, Manufacture or Processing of Toxic Substances	No
19. Chemical Storage/Use	Yes
20. Pesticide Use	No
21. Hazardous, Toxic, or Criteria Pollutant Air Emissions	No
22. Liquid Effluent	Yes
23. Underground Injection	No
24. Hazardous Waste	Yes
25. Underground Storage Tanks	No
26. Radioactive (AEA) Mixed Waste	No
27. Radioactive Waste	Yes
28. Radiation Exposures	Yes

C. Other Relevant Disclosures. Will the proposed action involve the following?	**Yes/No**
29. A threatened violation of ES&H regulations/permit requirements	No
30. Siting/Construction/Major Modification of Waste Recovery or TSD Facilities	No
31. Disturbance of Pre-existing Contamination	No
32. New or Modified Federal/State Permits	Yes
33. Public controversy (e.g., Environmental Justice Executive Order 12898 consideration and other related public issues)	No
34. Action/involvement of Another Federal Agency (e.g., license, funding, approval)	No
35. Action of a State Agency in a State with NEPA-type law. (Does the State Environmental Quality Review Act Apply?)	No
36. Public Utilities/Services	No
37. Depletion of a Non-Renewable Resource	No

IV. **Section D Determination**: Is the project/activity appropriate for a determination by the Area Manager under Subpart D of the DOE NEPA Regulations for compliance with NEPA?

Yes

Indicate the recommendation and specific class of action from Appendix A-D to Subpart D (10 CFR 1021):

CX

B3.10 Siting/construction/operation/decommissioning of particle accelerators, including electron beam accelerators, primary beam energy less than approximately 100 MeV

DOE Recommendation:

BAO NEPA Coordinator: Caroline Polanish Signature: Caroline Polanish

Date: 11/05/01

LGL-GL: Irene P. Atney Signature: Irene P. Atney

Date: 11/7/01

Group Manager Subpart D CX Determination and Approval:

The preceding pages are a record of documentation required under DOE Final NEPA Regulation, 10 CFR Part 1021.400, to establish that an action may be categorically excluded from further NEPA review. I have determined that the proposed action meets the requirements for the Categorical Exclusion referenced above. Therefore, by my signature below, I have determined that the proposed action may be categorically excluded from further NEPA review and documentation.

BAO Area Manager: Michael D. Holland Signature: M. Holland

Date: 11/7/01

V. Additional Information

A8 Although BNL is situated over a Sole Source Aquifer, operation of this accelerator facility should not affect the aquifer. This would include discharges to the BNL sanitary and storm water systems. The BNL Standards Based Management System Subject Area "Liquid Effluents" provides requirements related to discharges. Work planning, experimental review, and Tier I safety inspections are the three methods for ensuring that hazardous effluents do not make their way into the sanitary waste stream or storm water discharges.

B13 Excavation would be required to install new piping associated with cooling tower discharge water. Excavation would be limited to the area immediately adjacent the piping route. While the excavation area will be less than 5 acres, standard construction techniques, such as silt-fences and/or straw-bales, would be used to control runoff during excavation. Excavated areas associated with the piping would be backfilled and returned to grade.

B19 Routine operation and maintenance actions associated with the accelerator facility would involve the use of chemicals or compounds, generally in small quantities. BNL's Chemical Management System would track the quantity, location, owner, and storage of any chemical inventory.

B22 Any discharges associated with the proposed action, including cooling tower effluent, would be managed according to the BNL Standards Based Management System Subject Area "Liquid Effluents".

B24 Routine operation and maintenance actions associated with the accelerator facility would result in a small amount of hazardous wastes being generated, primarily cleaning compounds. The total volume generated would not be expected to exceed a few cubic feet per year and would not constitute a significant increase to Collider-Accelerator Department total estimates. All hazardous wastes would be managed in accordance with established BNL procedures and subject areas. Work planning, experimental review, and Tier I safety inspections are the three methods for ensuring wastes are minimized and controlled.

B27 Routine operation and maintenance actions associated with the accelerator facility would result in a small amount of radioactive waste being generated. The total volume generated would not be expected to exceed a few cubic feet per year and would not constitute a significant increase to Collider-Accelerator Department total estimates. All radioactive wastes would be managed in accordance with established BNL procedures and subject areas. Work planning, experimental review, and Tier I safety inspections are the three methods for ensuring wastes are minimized and controlled.

B28 Routine operation and maintenance actions associated with the accelerator facility would result in low-level radiation exposures to workers. Interlocks, access controls, training and procedure administration would be used to minimize exposures and employ ALARA principles.

C32 Depending on the disposition of cooling tower discharge, the existing New York State Pollutant Discharge Elimination System (SPDES) permit would be revised as necessary. The machine cooling system would be a closed loop deionized water system using ion exchange beds that would be removed for regeneration or disposal by a contractor off site. In no case would the electron beam strike the water directly, so water activation could only occur due to bremsstrahlung produced when electrons strike the accelerating structure or the beam pipe. At the proposed beam current and energy, no induced activity would be expected. Discharge of contaminants to the ground or to the sanitary system would be neither planned nor expected from the accelerator cooling system. The closed loop cooling system would be connected to the cooling tower

via a heat exchanger. Cooling-tower water would be treated either with ozone or with biocides and rust inhibitors, and would meet all SPDES effluent limits.

Environmental & Waste ManagementServices Division

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BROOKHAVEN
NATIONAL LABORATORY

managed by Brookhaven Science Associates
for the U.S. Department of Energy

Memo

Date: December 23, 2003

To: E. Lessard

From: M. Davis, NEPA/NHPA Coordinator

Subject: Evaluation of Scope Change to BNL-420 "Prototype Electron Cooling Device"

I have reviewed the revised information for the original proposed action identified below to determine if the scope has changed sufficiently as to require a separate NEPA review.

- BNL-420 "Prototype Electron Cooling Device", determined to be categorically excluded by DOE-BAO on 11/7/01

The planned project revisions are identified below:

Installation in a different building: Originally – Building 939; Revised – Building 912, NEBA experimental area, within a concrete blockhouse erected from existing shielding.

Electron beam parameters (overall energy levels are the same, but parameters have been varied): Originally – superconducting photoinjector electron beam = 1 mA current at an energy of 2 MeV; Revised = 0.5 A current at 2 MeV.

Originally - cooper photoinjector electron beam = 100 mA up to 4 MeV energy;
Revised cooper electron beam = 500 mA up to 1.5 MeV or 100 mA at 2.5 MeV.

Cooling water system: Originally – Newly constructed cooling tower (including excavation for piping); Revised – Use existing cooling tower(s), and no excavation or SPDES permit revisions.

The environmental aspects remain the essentially same as described in the initial NEPA EENF. There would be no excavation work or SPDES permit revisions in the revised plan. Therefore, these revisions are determined to be within the scope of the original project NEPA categorical exclusion. This review has been coordinated with C. Polanish, NEPA Coordinator for the DOE Brookhaven Area Office. If you have questions about this review please do not hesitate to contact me at extension 2165.

cc: C. Polanish

Email copies: G Goode, T. Green, R. Lee, M. Van Essendelft, J. Selva

ESD-EC51ER.03